



Course Descriptions, Contact Hours & Textbooks

This document provides details on each of the courses within the full NTMA-U training program, by series. It includes the required textbook, and the estimated number of contact hours for each course. All textbooks are available through the NTMA, and are discounted for our members.

The entire program totals 704 hours, and is approved by the Federal Bureau of Apprenticeship Training as the related training instruction for machining and tool and die apprenticeship programs.

Safety

NTMA-U 0-0960 Shop Safety - 45 Contact Hours

(No Textbook necessary)

While not required in the apprenticeship program, this course is highly recommended for anyone that works in or around a manufacturing environment! Basic Shop Safety practices, Drill Press safety, Machine Guarding, Lock-out/Tag-out, MSDS-SDS, Hazard Communication Standards, OSHA fact sheet, Safe Lifting, Blood Borne Pathogens, and First Aid.

Series 1

NTMA-U 1-1100-1A - Basic Blueprint - 38 Contact Hours

(Textbook: The Technology of Manufacturing Blueprint Reading for Machinist Training – also used in Series 2)

Basic Blueprint: This course teaches the proper terminology, symbols, and guidelines associated with reading and sketching blueprints, and how these are applied in a manufacturing environment. It focuses on reading as well as interpreting blueprints through the different views of an object, including dimensioning techniques, tolerancing, and fraction to decimal conversion, drafting lines using geometric equations, line types, orthographic views, isometric views, offset sections, auxiliary sections, symbols, and broken sections.

NTMA-U 1-1120-1A - Basic Math - 42 Contact Hours

(Textbook: New Practical Mathematics for Metalworking Trainees – also used in Series 2-6)

Basic Math: This course introduces math skills and concepts that are necessary in shop activities, including use of fractions, fraction to decimal conversion, and calculating angles.

NTMA-U 1-1200-1A - Precision Machining Technology - 42 Contact Hours

(Textbook: Precision Machining Technology–NIMS – also used in Series 2)

Machine Tools: This course has a strong focus on safety in the machine shop. It introduces the metallurgy of steel and iron and the fundamentals of metal cutting operations to produce manufacturing parts. It includes the operation of machinery, terminology, safety, measurement, layouts, print reading, machine set-ups, hand tools, quality measurement devices (e.g. rules, calipers, micrometers), and cutting tools. It highlights the use of typical equipment found in conventional machine shops.



Course Descriptions, Contact Hours & Textbooks

Series 2

NTMA-U 2-1200-2A - Precision Machine Technology 2 - 42 Contact Hours

(Textbook: Precision Machining Technology-NIMS)

Machine Technology 2: This course offers continued emphasis on shop safety and quality measurement devices. It focuses on the metal removal processes on typical equipment found in the machine shop, with emphasis on the drill press, engine lathe, milling machine, and surface grinder. It covers the use of workholding devices, as well as how to properly support and locate workpieces. It also reviews the applications of the Coordinate measuring machine (CMM), the optical comparator, and the electro-discharge machine (EDM).

NTMA-U 2- 1100-2 Intermediate Blueprint Module 2 - 38 Contact Hours

(Textbook: The Technology of Manufacturing Blueprint Reading for Machinist Training)

Intermediate Blueprint: This course is designed to increase your efficiencies in blueprint reading. This course emphasizes the relationship of blueprint drawings and how they apply to manufacturing parts including lines, views, dimensioning, and machining processes. It includes fraction to decimal conversion, drafting lines using geometric equations, line types, orthographic views, isometric views, offset sections, auxiliary sections, symbols, and broken sections.

NTMA-U 2-1120-2A - Applied Mathematics - 42 Contact Hours

(Textbook: New Practical Mathematics for Metalworking Trainees)

Applied Mathematics: This course is designed to increase your efficiencies in math skills and concepts that are necessary in shop activities. Emphasis on the relationship of math required for manufacturing of parts as viewed on blueprint drawings and how the concepts apply to manufacturing parts and machining processes.

Series 3

NTMA-U 3- 2300-3 CNC with Simulator - 38 Contact Hours

(No Textbook necessary)

CNC: This course introduces the tools and technology involved in computer numeric control (CNC) machining. It teaches G&M Codes and explains the principles of the Cartesian Coordinate System and how they apply to CNC. It also reviews the use of various metal cutting tools as they relate to CNC programming. This course will cover the process planning involved in creating CNC programs, including safety precautions, proper machine set up and operational skills, creating programs, and controlling part sizes with wear offsets.

NTMA-U 3 - 2500-3 Intermediate Applied Math - 42 Contact Hours

(Textbook: New Practical Mathematics for Metalworking Trainees)

Intermediate Applied Math: This course is the 3rd in a series, and is designed to increase your efficiencies in math skills and concepts that are necessary in shop activities. It explains how to properly use the Pythagorean theory and explains the use of trigonometric functions and their applications. It focuses on solving right triangle trigonometry problems, and also relates these trig functions to the use of sine bars and gage blocks for use in setting up angles to be machined.

NTMA-U 3-1500-3 Intermediate Blue Print Reading w/Basic GDT - 38 Contact Hours

(Textbook: Intro to Geometric Tolerancing and Dimensioning – also used in Semester 5)

Intermediate Blue Print Reading with Basic Essentials for GDT: This course introduces the symbols and concepts of geometric dimensioning and tolerancing as they relate to engineering drawings.

Series 4

NTMA-U 4-2720-4 Metallurgy - 38 Contact Hours

(Textbook: Material Science)

Metallurgy: This course introduces the nature and properties of materials. It presents a history of metals-providing background on the origins of various metals and provides an explanation of physical characteristics of metals. Students will study the chemical reactions and thermodynamics related to the production of steel as well as the key processes of iron making from the raw materials through to the final product. It stresses how metals are alloyed and formed to achieve desired mechanical properties-including comparisons between various forming processes including casting, forging, extrusion, and rolling.

NTMA-U 4-2800-4 Advanced Math - 38 Contact Hours

(Textbook: handouts that begin with 272-14)

Advanced Math: This course is the 4th in a series, and is designed to increase your efficiencies in math skills and concepts that are necessary in shop activities. It includes more complex applications, such as the use of the law of sines and the law of cosines.

NTMA-U 4- 2900-4 Quality Control / SPC / Inspection - 38 Contact Hours

(No Textbook necessary)

Quality Control / SPC / Inspection: This course introduces the area of quality control of mechanical parts in the industry. You will learn the skills necessary to properly inspect parts by using the skills you have obtained through blueprint reading of geometric dimensioning and tolerancing, as well as inspection tools and equipment. You will learn why these skills are necessary in the industry and how to properly apply them on the job. This course familiarizes students with the applications of statistics in process and quality control function. Upon completion, the student will be able to verify part dimensions, location, and orientation of finished products and parts.



Course Descriptions, Contact Hours & Textbooks

Series 5

NTMA-U 5-2420-5 Manufacturing Technology - 38 Contact Hours

(No Textbook necessary)

Manufacturing Technology: This course focuses on the machining of various metals. It will review the variations of speeds and feed rates for different types of material, as well as the use of various cutting tools.

NTMA-U 2500-5 GD&T - 38 Contact Hours

(Textbook: Intro to Geometric Tolerancing and Dimensioning)

GD&T: This course focuses on how to interpret and apply the concepts of geometric dimensioning and tolerancing to engineering drawings. Topics covered include fundamentals of symbols, terms used in application, positional tolerance applications, data frame and conversion tables.

NTMA-U 5-2800 – 5 Advanced Applied Math- 38 Contact Hours

(Textbook: Handouts begin with 297-74)

Advanced Applied Math: This course is the 5th in a series, it covers applied mathematics that are required to solve for unknown surfaces found on advanced blueprints.

Series 6 (Select 3 of the following)

NTMA-U 6-2420-6 Jig and Fixture - 38 Contact Hours

(Textbook - Basic Jig & Fixture)

Jig and Fixture: This course covers the necessary information for the designs of jigs, fixtures, and dies. It includes the use and application of bushings, locating devices, and work holding devices used in jigs, fixtures, and dies.

NTMA-U 6-2410-6 Moldmaking - 38 Contact Hours

(Textbook – Moldmaking)

Moldmaking: This course covers the principles of injection molding, including the molding press and how it works, the basics of an injection mold, and mold components. It explains the heating of cooling of molds and the runners, gates, venting and hot runner systems. It also describes the various methods of producing cavities, cores and various mold components.



Course Descriptions, Contact Hours & Textbooks

NTMA-U 6-2800-6 Advanced Math - 38 Contact Hours

(Textbook - handouts- begin with Prob 275-22)

Advanced Math: This course is the 6th in a series, it covers applied mathematics that are required to solve for unknown surfaces found on advanced blueprints.

NTMA-U 6-1300-6 Diemaking - 38 Contact Hours

(Textbook – Basic Diemaking)

Diemaking: This course provides specialized instruction in die construction, processes, and types related to automated manufacturing technology. This is an introduction to the basic types and construction of metal stamping dies. Topics include types of stamping dies and how they process sheet metal, standard die components, concepts of die clearances, die making terminology, and materials used in stamping die construction.

Advanced Courses

NTMA-U 0-0950 Advanced Diemaking Series 2 - 38 Contact Hours

(Textbook – Advanced Diemaking)

Advanced Diemaking: This course provides instruction in die to press relationships, automatic feeds, inverted dies, compound dies, and progressive dies using the blank through process. Topics also include progressive dies using the chopoff principle, progressive dies using the parting principle, and secondary operations such as: Dies to notch, Trim, Shave, Side-action Dies to pierce, Semi pierce, Shear form,. The content finishes with instruction in Drawing Operations, Redraw Dies, Combination Dies, and Computation Procedures.

NTMA-U 0-4000-7 Dimensional Metrology - 45 Contact Hours

(No Textbook necessary)

Technical manufacturing terms and principles, the proper use of common hand-held measuring tools. Measurement applications for Geometric Dimensioning and Tolerancing (GD&T) assessment of measurement quality. Interpretation of geometric dimensions and tolerances as specified for machine trade blueprint. Introductory probability and statistics including organization of data, sample space concepts, random variables, counting problems, binomial and normal distribution, central limit theorem, confidence intervals and test hypotheses for large and small samples, types I and II errors, linear regression and correlation



Course Descriptions, Contact Hours & Textbooks

Total Program Hours

Course Name / Series Name	Contact Hours
<i>Safety</i>	
NTMA-U 0-0960 Shop Safety	45
<i>Series 1</i>	
NTMA-U 1-1100-1A Basic Blueprint	38
NTMA-U 1-1120-1A Basic Math	42
NTMA-U 1-1200-1A Precision Machining Technology	42
<i>Series 2</i>	
NTMA-U 2-1200-2A Precision Machine Technology 2	42
NTMA-U 2- 1100-2 Intermediate Blueprint	38
NTMA-U 2-1120-2A Applied Mathematic	42
<i>Series 3</i>	
NTMA-U 3- 2300-3 CNC with Simulator	38
NTMA-U 3- 2500-3 Intermediate Applied Math	42
NTMA-U 3-1500-3 Intermediate Blue Print Reading w/Basic GDT	38
<i>Series 4</i>	
NTMA-U 4-2720-4 Metallurgy	38
NTMA-U 4-2800-4 Advanced Math	38
NTMA-U 4- 2900-4 Quality Control / SPC / Inspection	38
<i>Series 5</i>	
NTMA-U 5-2420-5 Manufacturing Technology	38
NTMA-U 2500-5 GD&T	38
NTMA-U 5-2800-5 Advanced Applied Math	38
<i>Series 6 (Select 3 of the following)</i>	
NTMA-U 6-2420-6 Jig and Fixture	38
NTMA-U 6-2410-6 Moldmaking	38
NTMA-U 6-2800-6 Advanced Math	38
NTMA-U 6-1300-6 Diemaking	38
<i>Advanced Courses</i>	
NTMA-U 0-0950 Advanced Diemaking Series 2	38
NTMA-U 0-4000-7 Dimensional Metrology	45
<i>Totals</i>	
Traditional RTI – choosing 3 from Series 6, no Advanced courses, no Safety	704
Traditional RTI + Safety	749
Tool & Die RTI – choosing 3 from Series 6, both Advanced courses, no safety	787
Tool & Die RTI + Safety	832

NTMA-U Publications, Instructor Guides & Resources Pricing Guide

Course Number	Course Name	Textbook/Publication/Resource	NTMA Member Price	Non-Member Price	Educator Price
1-1100	Basic Blueprint Reading	Blueprint Reading for Machinist Training	\$99	\$109	\$95
2-1100	Intermediate Blueprint Reading				
1-1120	Basic Math	New Practical Mathematics for Metalworking Trainees	\$52	\$57	\$50
2-1120	Applied Mathematics				
3-2500	Intermediate Applied Math				
1-1200	Precision Machining Technology	Precision Machining Technology 2nd Edition	\$124	\$130	\$124
2-1200	Precision Machining Technology 2				
3-1500	Intermediate Blueprint Reading w/Essentials for GD&T	Intro To Geometric Tolerancing & Dimensioning	\$55	\$60	\$54
5-2500	GD&T				
3-1500	Intermediate Blueprint Reading w/Essentials for GD&T	Blueprints for Series 3 Intermediate Blueprint Reading	\$68	\$73	\$65
4-2720	Metallurgy	Material Science for Precision Technician	\$27	\$27	\$27
6-1300	Diemaking	Basic Diemaking	\$36	\$40	\$34
6-2420	Jig and Fixture	Basic Jig & Fixture Making	\$38	\$42	\$36
6-2410	Moldmaking	Moldmaking & Die Cast Dies	\$52	\$57	\$50
7-0950	Advanced Diemaking	Advanced Diemaking	\$56	\$62	\$50
<i>Any</i>	<i>Any</i>	Harig Speed & Feed Calculator	\$15	\$17	\$15
<i>Any</i>	<i>Any</i>	Modern Geometric Dimensioning & Tolerancing	\$43	\$48	\$37
<i>Any</i>	<i>Any</i>	Precision Grinding	\$60	\$66	\$58
<i>Any</i>	<i>Any</i>	Precision Grinding Instructor's Guide	\$29	\$32	\$28
1-1120	Basic Math	New Practical Mathematics for Metalworking Trainees Answer Key	\$35	\$38	\$34
2-1120	Applied Mathematics				
3-2500	Intermediate Applied Math				
3-1500	Intermediate Blueprint Reading w/Essentials for GD&T	Intro To Geometric Tolerancing & Dimensioning Instructor's Guide	\$33	\$35	\$30
6-1300	Diemaking	Basic Diemaking Instructor's Guide	\$39	\$41	\$38
6-2420	Jig and Fixture	Basic Jig & Fixture Making Instructor's Guide	\$30	\$33	\$29
6-2410	Moldmaking	Moldmaking & Die Cast Dies Instructor's Guide	\$30	\$33	\$29
7-0950	Advanced Diemaking	Advanced Diemaking Instructor's Guide	\$31	\$33	\$30

[Click Here to Order Textbooks](#)